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U.S. ARMY

HUMAN FACTORS ENGINEERING

BIBLIOGRAPHIC SERIES

VOLUME 2

1960-1964 LITERATURE

Prepared by

THE PROJECT STAFF
DEPARTMENT OF DEFENSE
HUMAN FACTORS ENGINEERING INFORMATION ANALYSIS CENTER

Institute for Psychological Research
Tufts University

October 1966

HUMAN ENGINEERING LABORATORIES

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U. S. ARMY HUMAN ENGINEERING LABORATORIES
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FOREWORD

The Department of the Army was assigned responsibility, effective 1 October 1965, for the development and maintenance of a Human Factors Engineering Information Analysis Center in accordance with the provisions of the Department of Defense Scientific and Technical Information program (DoD Instruction 5100.45). At present the Information Analysis Center is located at Tufts University under the technical guidance of the U. S. Army Human Engineering Laboratories.

The Office of Naval Research initiated the Tufts University effort over ten years ago. This volume, the one preceding it, and a subsequent volume, covering the human factors engineering literature from 1940 through 1965, although published by the U. S. Army Human Engineering Laboratories, is a result of the Office of Naval Research support and direction of this program during its formative years.

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Introduction

This document is the second in a series of bibliographies covering the human factors engineering literature. The first volume, HEL BIB VOL I, covered the 1940 through 1959 literature. The present bibliography contains material, for the most, from the time period 1960 through 1964. A third bibliography dealing with the 1965 literature will be published soon.

As in the past the project staff was influenced by several considerations in the selection of references for inclusion in the bibliography. First, there was an attempt to select those references which reflected the broad spectrum of revealed interests of human factors personnel. Second, the documents had to be available to the project staff for examination prior to coding and abstracting. If the document was not among the acquisitions of the project, it was not included in the bibliography.

Because of the tremendous volume of literature published during this period, the project staff was not able to acquire every document of relevance. The present volume should, however, provide a useful compilation of references to the human factors engineering literature which reflect the cumulative (through 1964) acquisitions of HEIAS.

This and future volumes will be published in punched loose leaf page format. This will permit additions of new material and modifications of old. Additions will be in the form of new acquisitions. Modifications will be primarily in the form of changes to the index and the resulting changes in the coding of the accessions involved. At some later date it is planned to publish a complete set of those pages that have been or will have been modified. Also at some later date an author index will be published. It is suggested that the user place the present volume in a notebook (or notebooks) or whatever form he finds convenient for use and future modifications.

Instruction in the Use of the Present Bibliography

General

The user should examine the index (Part I) thoroughly before attempting to locate references on a specific topic. Familiarization with the terms is essential if effective retrieval is to be realized. After examining its content, the user should be able to enter the index with the terms which are descriptive of, or synonymous with his query. Documents have been coded only to those terms or descriptors which are underlined. Having noted the terms of interest he should then go to Part II (Facsimile of Subject Matter File) and under the appropriate terms find the accession numbers of those documents which have been coded to that term. Noting these numbers he can then go to Part III (Citations and Abstracts) to find the actual references.

Index Changes

There have been some slight modifications in the index published in the first volume of this series. These changes are reflected in the present index. Some of the modifications are described below:

	(added)	Airport facilities
Ambient Noise level of background, general	(changed to)	Ambient Noise level office, home, and general background
rockets, missiles	(changed to)	rockets, missiles, and launch facilities

Anthropometric Measures body density centers of gravity	(changed to)	Anthropometric Measures body density and centers of gravity
Auditory reaction time	(changed to)	Auditory reaction time--see Reaction Time and Refractory Period
Auditory skills sonar listening	(changed to)	Auditory skills sonar listening--see Monitoring, above
Automatic checkout systems	(changed to)	Automatic checkout systems--see Maintenance (systems)
Clothing belting	(changed to)	Clothing belts and fasteners
Controls ship and submarine controls	(changed to)	Controls ship and submarine controls--see Ship and Submarine
vehicle controls	(changed to)	vehicle controls--see Vehicle
Displays size	(changed to)	Displays size and shape
Escape from aircraft	(changed to)	Escape from aircraft and spacecraft
submarines	(changed to)	submarines--see Ship and Submarine
Groups effectiveness problem solving productivity	(changed to)	Groups performance
size structure	(changed to)	size and structure

Individual Factors Affecting Performance attention set	(changed to)	Individual Factors Affecting Performance set and attention
Life Jackets	(changed to)	Life Jackets--see Sea (rescue)
Lighting Systems outdoors airfields	(changed to)	Lighting Systems outdoors airport
	(added)	Machine Recognition
Motion, Effects of amplitude and frequency oscillatory rotation	(changed to)	Motion, Effects of rotation and oscillation (includes amplitude and frequency)
	(added)	sub-category of general to Optical Aids
Overlays	(changed to)	Overlays--see Radar and other CRT Displays
Panel and Console Design ships and submarines	(changed to)	Panel and Console Design ships and submarines--see Ship and Submarine (controls, displays, and instrument panel design)
vehicles	(changed to)	vehicles--see Vehicle (controls, displays, and instrument panel design)
Physiological Capacities	(changed to)	Physiological Capacities and Indices
	(added)	electroencephalogram
Physiological Equipment and Methods first five sub-categories	(changed to)	Physiological Equipment and Methods electrophysiological techniques
Printed Material, Legibility, and Readability general references readability	(removed)	

Sea craft, design of	(changed to)	Sea craft, design of--see Ship and Submarine
Sensory facilitation and inhibition of reception	(changed to)	Sensory interaction (i.e., effects of stimulation in one modality on perception in another; includes facilitation and inhibition)
Ship lighting systems exterior	(changed to)	Ship and Submarine controls, displays, and instrument panel design escape systems general habitability lighting systems
Space Flight Systems control systems	(changed to)	Space Flight Systems control and display systems
Space Travel maneuvers	(changed to)	Space Travel maneuvers and performance
Speech communication systems ship	(changed to)	Speech communication systems ship and submarine
Submarine controls crews--see Groups displays escape systems general references habitability	(changed to)	Submarine--see Ship and Submarine
	(omitted from 1940-59 product)	Underlining of television under Training Aids and Devices
Underwater environmental effects oxygen requirements pressure requirements	(changed to)	Underwater oxygen and pressure requirements

	(added)	Vehicle controls, displays, and instrument panel design
Visual acuity colored illumination general references types of dynamic static	(changed to)	Visual acuity dynamic general illumination
Visual reaction time	(changed to)	Visual reaction time--see Reaction Time and Refractory Period
Windshields evaluation of	(changed to)	Windshields--see also Aircraft (design); Vehicle (design)
Work Place Design illumination command centers	(changed to)	Work Place Design illumination command centers--see other facilities, below
factory and office home	(changed to)	factory, office, and home
ship and submarine	(changed to)	ship and submarine--see Ship and Submarine
vehicle	(changed to)	vehicle--see Vehicle

The Index and Its Use

The accessions are only coded to those terms which are underlined and in the cases of subheading, are coded to the lowest subcategory (i.e., to the secondary or tertiary heading, if there is one). For example, if the reader will note the category Aging, Effects of, he will find a number of secondary categories, such as vision; motor performance; etc. No references have been coded to Aging, Effects of, as such, but only to the secondary headings. In the case of Radar and other CRT Displays the reader will note the secondary heading screen and under this, various tertiary headings, such as size and shape. Relevant documents, for example those dealing with the shape of radar screens or scope faces, have been coded to the lowest subcategory, in this case size and shape. No references will have been coded to screen alone.

The index can, of course, be used as a hierarchical system or a coordinate index. For example, if a user were interested in articles dealing with drugs and their effects, he would examine the references listed in the category Drugs. Similarly, if he were interested in articles dealing with man's tolerance to acceleration, he would go to the category Motion, Effects of/acceleration and deceleration/tolerance. However, if he were interested in the effects of drugs on man's tolerance to acceleration forces, rather than go through all the references in the above mentioned categories, the reader should note only those accession numbers common to both categories. The loose leaf notebook form should facilitate this type of matching.

The reader is advised to look through the various general categories in making a search. These categories contain not only

references of a general nature, books, bibliographies, etc., but in some cases miscellaneous articles which could not be readily coded elsewhere. Occasionally, the reader will note a secondary heading "other". These categories contain references to equipment, methods, topics, etc., not specifically listed under the main heading.

An index of this nature develops through use. All relevant terms and descriptors cannot be anticipated in its initial development and are often incorporated only after the index has been in use for some time. Therefore, if the user cannot find terms specifically descriptive of his problem he should attempt to find synonymous terms. As mentioned previously, the user should examine the whole index thoroughly before attempting to locate specific topics.

Facsimile of Subject Matter File

Part II contains those categories to which documents have been coded along with the accession numbers of the documents. In essence, it represents the index stripped to the bare essentials, i.e., minus all cross headings and notes. The user will note that there are several categories with only a few or no references coded to them. These categories were left in the index because it is known that in the 1960-1965 bibliographies, there will be a number of references coded to them.

Citations and Abstracts

Part III contains the actual citations and abstracts listed in numerical order by accession number. This section was compiled by filming the actual 3x5 citation and abstract cards from the files of HEIAS. In some cases the reference material was on a 5x8 card. This

presented layout problems and in an attempt to conserve as much space as possible some cards had to be placed sideways for filming. While we realize this presents somewhat of an inconvenience for the reader, we feel the conservation of space was worth it.

The format of the citations is generally in keeping with the recommendations of the Publication Manual of the American Psychological Association. In some instances, however, variation in the amount and type of information in the original document has introduced some variation in the final citation. The content of the citation tries to maximize the amount of information to assist the user in acquiring a copy of the document.

The abstracts for the most part are descriptive only and do not contain results. However, in the future results will be included. It was simply too great a task to go back and re-abstract documents for this bibliography. The letter codes found at the end of the abstract, the T, I, G, and R designations indicate that the document contains: T-tables, I-illustrations, G-graphs, and R-references (e.g., R-7 means that 7 references were cited). A list of abbrevations used in the abstracts is given on the next page.

The documents cited are not available from Tufts University, but are held in repository at HEIAS and may be examined on the project's premises.

KEY TO ABBREVIATIONS

a.c.	alternating current
AD	average deviation
AFGCT	Armed Forces General Classification Test
AGCT	Army General Classification Test
AL	adaptation level
amp.	ampere
ANIP	Army-Navy Instrument Program
ANOVA	analysis of variance
AP	action potentials
AR	acoustic reflex
AVID	Advanced Visual Information Display
bit	unit of information
BMR	basal metabolic rate
C	centigrade
ca	about or approximately
cc	cubic centimeter
CCC	Combat Control Center
cff	critical flicker frequency
CIC	Combat Information Center
clo	measure of protective value of fabrics
cm	centimeter
CNS	central nervous system
CO	carbon monoxide
CO_2	carbon dioxide
cpm	cycles per minute
cps	cycles per second
CR	critical ratio
CRT	cathode ray tube
cu ft	cubic foot
db	decibel
d.c.	direct current
df	degrees of freedom
DL	difference limen
E, Es.	experimenter, experimenters
EEG	electroencephalogram
e.g.	for example
EKG or ECG	electrocardiogram
EMG	electromyogram
ERG	electroretinogram
et al	and others
etc.	and so forth
Exp.	experiment
f	frequency
F	fahrenheit, F-ratio
ft	foot
ft-c	foot-candle
ft-L	foot-Lambert
ft-lbs	foot-pounds
ft/sec	feet per second
g	acceleration of normal pull of gravity
G	gravitational force acting upon an object
GCA	Ground Control Approach
GSR	galvanic skin response
Hg	mercury
hr.	hour
i	intensity
IBM	international Business Machine
i.e.	that is
ILS	Instrument Landing System
in.	inch
IQ	Intelligence Quotient
j.n.d.	just noticeable difference
kc	kilocycle
kg	kilogram
KR	knowledge of results
L	lambert
LL	loudness level
lb	pound
m	meter
M	mean
Ma	milliampere
Mc	megacycle
Mdn	median
mg	milligram
mi	mile
min.	minute
mL	millilambert
mm	millimeter
MOS	Military Occupational Specialty
mph	miles per hour
msec	millisecond
m	millimicron
µsec.	microsecond
N	number of
°	degree
O, Os.	observer, observers
O_2	oxygen
OCS	Officers' Candidates School
OR	Operations Research
p	probability level
PB	phonetically balanced
PERT	Program Evaluation and Review Technique
PGR	psychogalvanic skin response
PI	photo interpretation
PPI	Planned Position Indicator

KEY TO ABBREVIATIONS (cont'd)

pps	pulses per second
psi	pounds square inch
PSS	Personnel Subsystem concept (USAF)
PED	Personnel and Equipment Data file
HE	verifying Human Engineering design Standards
QQPRI	Qualitative and Quantitative Personnel Requirements Information
PSTE	Personnel Subsystem Test and Evaluation
TC	Training concepts
TED	Training Equipment Development program
TEPI	Training Equipment Planning Information
TOTM	Technical Orders and Manuals
TP	Training plans
r	roentgen, correlation coefficient
rad	absorbed dose of radiation
REM	Roentgen equivalent in man
RBE	relative biological effectiveness
ROTC	Reserve Officers Training Corps
rpm	revolutions per minute
RT	reaction time
S, Ss	subject, subjects
SAGE	Semi Automatic Ground Environment
SD	standard deviation
SDT	signal detection theory
sec.	second
S/N	signal-to-noise ratio
SPL	sound pressure level
S-R	stimulus-response
SUBIC	Submarine Integrated Control
t	t-test
TTS	temporary threshold shift
vs	versus
VTOL	Vertical Takeoff and Landing Aircraft

SYMBOLS:

x^2	chi square
%	per cent
>	more than
<	less than
=	equal
ΔI	change in intensity
μ	micron
σ^2	variance

A

Ambient Noise
level (cont'd)
vehicle (motor)
weapons
measurement (e.g., spectral analysis, critical band analysis)
reduction and control--see also Acoustic (design); Work Place Design (acoustics)
acoustic shielding
general
hearing conservation program
noise reducing devices and systems
personal equipment (e.g., earplugs)--see Auditory (devices)
standards of tolerance and annoyance
speech interference level--see Speech (masking)
tolerable level--see reduction and control, above
Amplifiers--see Auditory (equipment)
Anchoring Effects--see Perception (general); Psychophysics
Anechoic Chambers--see Audition (equipment and methods)
Angle, Perception of--see Visual (perception)
Ankle Dimensions--see Anthropometric Measures
Anomalies
auditory--see Audition
sensory, other--see specific sensory categories
visual--see Visual
Anoxia--see Environmental Conditions and Effects (oxygen requirements)
Anthropometric Measures
arm and leg dimensions
biomechanical analysis
body density and centers of gravity
body size and dimensions
equipment and methods
extent and flexibility of limb movement
general
hand and foot dimensions
head dimensions
locomotion
muscular strength and endurance
posture
somatotyping
space requirements--see also Work Place Design (area requirements)
Anti-g-Suits--see Clothing (high altitude and anti-g)
Anxiety--see Individual Factors Affecting Performance (emotion)
Anxiety, Tests of--see Tests and Testing (personality and sociometric)
Apparent Movement--see Visual (perception)
Aptitude--see Individual Factors Affecting Performance
Aptitude Testing--see Tests and Testing
Aqua Lung--see Underwater (breathing apparatus)
Arctic Climate Clothing--see Clothing (Arctic ensembles and cold weather)
Arm
dimensions--see Anthropometric Measures
movement--see Anthropometric Measures; Motor Performance and Skills
strength--see Anthropometric Measures (muscular strength and endurance)
Armored Vehicle--see Vehicle
Armored Vests--see Clothing (body armor)
Articulation Testing--see Communications Systems (techniques for evaluation); Speech
Artificial Intelligence (biosimulation)

Artificial Limbs--see Prosthetics

Asbestos Suits--see Clothing (thermal protection)

Aspiration, Level of--see Individual Factors Affecting Performance (motivation and morale)

Assignment of Functions to Men and Machines in Systems

Assignment of Personnel--see Personnel

Atmosphere--see Environmental Conditions and Effects

Attention--see Individual Factors Affecting Performance (set and attention); Perception; Training (basic learning data); Vigilance and Monitoring

Attenuators--see Auditory (equipment)

Attitude Indicators--see Displays (type)

Attitude Toward Task--see Individual Factors Affecting Performance (acceptability of and attitude toward equipment and tasks)

Audiogyric Effects--see Orientation in Space, Factors Determining; Perception (illusions)

Audiometry--see Audition (equipment and methods); Speech

Audio-Visual Aids--see Training Aids and Devices

Audio-Visual Interaction--see Sensory (interaction)

Audio-Visual Monitoring--see Vigilance and Monitoring (performance)

Audio-Warning Devices--see Auditory (displays, nonverbal); Warning Devices

Audition

- aftereffects of stimulation (e.g., acoustic reflex, fatigue, pitch shifts, time errors, etc.)
- aging--see Aging, Effects of; norms, below
- anomalies and individual differences
- auditory patterns and meaning (e.g., flutter discrimination, melodic and temporal)
- binaural vs. monaural
- equipment and methods (e.g., anechoic chambers, audiometric devices, communication simulators, techniques of audiometry)
- general
- norms
- physiological mechanisms
- psychophysical scales (e.g., mel scale, sone scale)
- recruitment
- repetitive stimulation
- sound localization
- standards and specifications
- stimulus characteristics
  - frequency and pitch
  - intensity and loudness
  - other (e.g., brightness, duration, timbre, vocality)
- stimulus mixtures (e.g., harmonics, beats, combination tones, modulations)
- thresholds
- training, nonverbal--see Training (specific types)

Auditory

- acuity--see Audition (thresholds)
- adaptation--see Audition (aftereffects of stimulation)
- detection--see skills, below
- devices
  - ear defenders (e.g., plugs, pads, etc.)
  - enhancement devices (e.g., hearing aids, guidance for blind, etc.)
- displays, nonverbal--for systems utilizing verbal communication, see Speech (communication systems)
  - flight guidance systems (flybar)
  - intermittent warning and signaling devices (e.g., sirens, bells, radio range)
  - multi-channel
  - sonar and other underwater sound systems
  - telegraphic systems

Auditory (cont'd)
- equipment
  - input devices (e.g., microphones, vibration pickups)
  - output devices (e.g., earphones, loudspeakers)
  - transmission devices (e.g., amplifiers, attenuators, frequency modulators, scramblers)
- fatigue--see Audition (aftereffects of stimulation)
- feedback--see signals, below
- flight guidance systems--see displays, above
- localization--see Audition (sound localization)
- masking--for speech masking, see Speech
- noise--see Ambient Noise
- numerousness--see signals, below
- patterns--see Audition
- reaction time--see Reaction Time and Refractory Period
- search--see skills, below
- signals
  - channel capacity
  - coding
  - detection--see skills, below
  - feedback
  - general characteristics
  - to-noise ratio
- skills
  - discrimination
  - monitoring
  - search and detection
  - sonar listening--see monitoring, above
  - tracking--see Tracking
  - training--see Training (specific types)
- vs. visual presentation--see Sensory (comparison)

Aural Harmonics--see Audition (stimulus mixtures)
Aural Reading Devices--see Auditory (devices)
Auto-Correlation Function--see Mathematical and Statistical Methods
Autoinstruction--see Programmed Instruction; Training Aids and Devices (teaching machines)
Autokinetic Effects--see Visual (perception)
Automatic
- checkout systems--see Maintenance (systems)
- control systems--see Controls
- learning devices--see Training Aids and Devices (teaching machines)
- maintenance--see Maintenance (systems)

Automation
Automobile Accidents--see Safety
Automobile Design--see Vehicle
Automobiles--see Vehicle
Aviation Medicine--see Environmental Conditions and Effects (general)

B

Backlighting--see Instrument Lighting (rear)
Back Rests--see Seats and Seating (body supports)
Ballistic Vests--see Clothing (body armor)
Band Compression Speech--see Speech (distortion)
Barometric Pressure--see Environmental Conditions and Effects
Basic Training--see Training (specific types)

Beacon Lights--see Warning and Signal Lights

Bearing Information Aids--see Radar and other CRT Displays (range and bearing scales and aids)

Beats--see Audition (stimulus mixtures)

Bells--see Auditory (displays, nonverbal)

Belts, Harnesses, and other Restraining Devices--see also Clothing (belts and fasteners)

Bends--see Environmental Conditions and Effects (decompression)

Betting Behavior--see Subjective Probability

Bibliographies--see General and Comprehensive References in Human Factors Engineering; bibliographies also are included under general in major topics

Binaural Discrimination--see Audition (binaural vs. monaural)

Binocular Disparity--see Visual (perception)

Binocular Field--see Visual (field)

Binoculars--see Optical Aids

Biodynamics--see also Anthropometric Measures; Motor Performance and Skills

Bioelectric Methods and Equipment--see Physiological Equipment and Methods

Bio-instrumentation--see Physiological Equipment and Methods

Bio-kinetic Analysis--see Anthropometric Measures; Motor Performance and Skills

Biomechanical Analysis--see Anthropometric Measures; Motor Performance and Skills

Bionics

Biosimulation--see Artificial Intelligence

Bisectioning Movements--see Motor Performance and Skills

Black Light--see Light (special types)

Blackout--see Motion, Effects of (acceleration and deceleration)

Blindness-see Visual (anomalies and individual differences)

Blindness, Flash--see Flash

Blinking--see Motor Performance and Skills (involuntary reflexes)

Blinking Signal Lights--see Flash (rate); Traffic (signs and signals); Warning and Signal Lights

Blink Rate--see Flash; Motor Performance and Skills (involuntary reflexes)

Body

- armor--see Clothing
- build--see Anthropometric Measures
- density--see Anthropometric Measures
- movement, perception of--see Perception
- size and dimensions--see Anthropometric Measures
- supports--see Belts, Harnesses, and other Restraining Devices
- temperature--see Physiological Capacities and Indices

Bone Conduction--see Audition (physiological mechanisms)

Books in Human Factors Engineering--see General and Comprehensive References in Human Factors Engineering

Boredom--see Individual Factors Affecting Performance (motivation and morale)

Braille Systems--see Tactile Coding

Breathing Capacity--see Physiological Capacities and Indices

Breathing Devices and Equipment--see also Masks; Underwater

Brightness

- comfort relation--see Visual (comfort and fatigue)
- discrimination--see Visual
- sky--see Light (natural)

Broad Band Blue Illumination--see Light (special types)

Buffeting--see Vibration (whole body)

C

Cabs, Truck--see Vehicle

Caffeine, Effects of--see Drugs

Caloric Intake--see Diet, Food, and Nutrition

Calorimetry--see Physiological Equipment and Methods (metabolic measurement)

Camouflage and Concealment

Canal Sickness--see Motion, Effects of (sickness)

Cardio-vascular Indices--see Physiological Capacities and Indices

Cards, Design of (e.g., data processing cards, E-Z Sort, etc.)

Cargo Handling Systems--see Supply Systems

Carrier Approach Light Systems--see Aircraft (landing and landing systems); Lighting Systems (outdoors)

Carriers--see Packs and Carriers

Cathode-Ray-Tube Displays--see Radar and other CRT Displays

Centers of Gravity--see Anthropometric Measures

Centrifuge--see Motion, Effects of (equipment and methods)

Channel Capacity--see Auditory (signals); Sensory (comparison); Visual (information processing)

Characters and Symbols, Design of--see Numerals, Letters, and Characters, Design of

Charts, Design of--see Maps and Charts, Design of

Check Lists--see Job Performance Aids

Chest Measurement--see Anthropometric Measures (body size and dimensions)

Choice Behavior--see Individual Factors Affecting Performance (thought processes)

Chopping--see Speech (distortion)

Chronophotography--see Motor Performance and Skills (equipment and methods)

Cinematography--see Films; Training Aids and Devices

Click-Pitch Threshold--see Audition (stimulus characteristics); Auditory (signals)

Climatic Chamber--see Environmental Conditions and Effects (equipment and methods)

Clipping--see Speech (distortion)

Closed Ecological Systems--see Space Flight Systems (sealed cabins)

Clothing

- Arctic ensembles and cold weather
- belts and fasteners
- body armor
- equipment and methods
- fabrics
- flight
- footgear
- general
- handgear
- headgear
- high altitude and anti-g
- noxious agents, protection (e.g., rocket fuel, liquid oxygen, etc.)
- radiation protection
- restrictive effects
- sizing, techniques of measurement
- space suits
- tests of--see equipment and methods, above
- thermal protection
- tropical ensembles
- underwater ensembles--see Underwater

Cochlear Response--see Audition (physiological mechanisms)

Cockpit Lighting--see Work Place Design (illumination)

Cockpits--see Aircraft (design)

Coding

- auditory signals--see Auditory (signals)
- color--see Color
- controls--see Controls
- kinesthetic--see Kinesthesis
- lights--see Light
- tactile--see Tactile Coding
- visual--see Visual

Cognitive Processes--see Individual Factors Affecting Performance (thought processes)

Cold Environments--see Environmental Conditions and Effects

Cold Weather Protective Clothing--see Clothing (Arctic ensembles and cold weather)

Collision, Mid-Air--see Safety

Color--see also Vision (color vision)

- coding--see also Light
- filters--see Optical Aids; Vision (equipment and methods)
- lights--see Light
- paints and finishes--see Paints, Finishes, and Surfaces
- phenomena--see Vision (color vision)
- preference--see Vision (color vision)
- smokes--see Signaling Systems, Visual
- systems (e.g., abridged systems, international XYZ system, etc.)--see Visual (standards and specifications)

Colorimetry--see Vision (equipment and methods)

Combat Information Centers, CIC--see Command and Control Systems

Combination Tones--see Audition (stimulus mixtures)

Comfort--see also Seats and Seating; Visual (comfort and fatigue)

Command and Control Systems

Communication and Information Theory

- general
- information assessment and processing
- redundancy, uncertainty

Communication Systems

- general
- group--see Groups
- nonverbal--see Auditory (displays, nonverbal); Tactile Coding
- speech--see Speech
- techniques for evaluation

Comparison of Sensory Channels--see Sensory (comparisons)

Compatibility, Stimulus-Response--see Control-Display Dynamics; Sensory (general)

Compensatory Tracking--see Tracking

Complexity of Work or Task--see Work and Task Performance

Complex Tones--see Audition (stimulus mixtures)

Compression and Expansion, Speech--see Speech (distortion)

Computers

- data processing systems
- design
- general
- man interaction
- models and programs
- simulation--see also Simulation and Simulators
- systems component

Concept Formation--see Individual Factors Affecting Performance (thought processes); Training (basic learning data)

Confinement--see Prolonged Confinement

Console Design--see Panel and Console Design

Contact Analog Displays--see Displays (type)

Containers and Packaging

Contaminated Environments--see Environmental Conditions and Effects

Control-Display Dynamics

- compatibility and motion stereotypes
- feedback--see Tracking
- general
- integration
- movement ratios
- quickening--see also Tracking

Cursors--see Radar and other CRT Displays (range and bearing scales and aids)

Cushions--see Seats and Seating

Cutaneous Communication Systems--see Tactile Coding

Cutaneous Sense--see Touch

Cybernetics

D

Damping--see Ambient Noise (reduction and control); Controls (resistance)

Dark Adaptation--see Visual (adaptation, pre-adaptation, and pre-exposure)

Data

- analysis--see Mathematical and Statistical Methods
- processing systems--see Computers

Daylight--see Light (natural)

Dazzle--see Flash (blindness); Visual (comfort and fatigue)

Deafness--see Ambient Noise (hearing loss)

Deceleration--see Motion, Effects of (acceleration and deceleration)

Decision Analysis--see Game and Decision Theory; Methods and Techniques for Study and Analysis of Tasks, Operations, and Systems

Decision Making--see Command and Control Systems; Individual Factors Affecting Performance (thought processes)

Decision Theory--see Game and Decision Theory

Decompression Sickness--see Environmental Conditions and Effects (decompression)

Depth Perception--see Visual (perception)

Desert--see Clothing; Environmental Conditions and Effects (hot)

Detection, Auditory--see Auditory (skills)

Detection Theory--see also Psychophysics

Detection, Visual--see Visual (search and detection)

Dial and Scale Design--see Displays

Dial Setting--see Motor Performance and Skills (positioning movements)

Diet, Food, and Nutrition

Difference and Summation Tones--see Audition (stimulus mixtures)

Digital Displays--see Displays (type)

Dimensions

- body--see Anthropometric Measures
- furniture--see Furniture Design
- work place--see Work Place Design

Discriminability Scaling--see Psychophysics

Disorientation--see Orientation in Space, Factors Determining

Display-Control Dynamics--see Control-Display Dynamics

Displays

- auditory--see Auditory (displays, nonverbal)
- dial and scale design
- general
- location--see Panel and Console Design
- pointer design
- quickened--see Control-Display Dynamics; Tracking
- reading and interpretation problems
- size and shape
- type
  - airspeed indicators
  - altimeters
  - attitude indicators
  - combined displays (integrated)
  - comparison of types (e.g., outside-in vs. inside-out)
  - heading indicators
  - indicator and warning--see also Warning Devices
  - integrated displays--see combined displays, above

E

Environmental Conditions and Effects (cont'd)

- climatic chamber--see equipment and methods, below
- cold
- decompression
- equipment and methods
- evaporative cooling
- general
- heating
- hot (includes both desert and tropical environments)
- humidity
- ionized air
- oxygen requirements
- radiation
- space--see Space Travel
- temperature (room)
- thermal radiation
- tolerance, adaptation, acclimatization
  - altitude and pressure
  - cold
  - heat
  - weightlessness--see Space Travel; Weightlessness
- toxic environments
- ventilation
- water--see also Underwater
- windblast, airblast, windchill

Equipment

- arrangement--see Work Place Design
- design and evaluation (includes equipment not covered elsewhere, e.g., electronic equipment)
- noise--see Ambient Noise

Equipment Used in Human Factors Research

Ergonomics--see General and Comprehensive References in Human Factors Engineering

Error

- analysis--see Mathematical and Statistical Methods
- equipment--see also Maintenance
- human

Escape from

- aircraft and spacecraft--see also Ejection Capsules; Seats and Seating (ejection)
- other places
- submarines--see Ship and Submarine

Exercise and Performance--see also Physical Fitness and Performance

Exits and Entrances--see Work Place Design (passageways)

Experimental Method--see Research Techniques in Human Factors Engineering

Explosive Decompression--see Environmental Conditions and Effects (decompression)

Eye

- as Control Mechanism--see Controls
- blink--see Motor Performance and Skills (involuntary reflexes)
- dominance
- fixation--see Panel and Console Design (spatial dynamics, frequency of use of components, and order of use); Printed Material, Legibility, and Readability
- movement

F

Face Masks--see Masks

Face-to-Face Communication--see Speech (communication systems)

Facial Measurements--see Anthropometric Measures

Facilitation of Reception--see Sensory (interaction)

Frictional Resistance--see Controls (resistance)

Frostbite--see Environmental Conditions and Effects (cold)

Function Analysis--see Methods and Techniques for Study and Analysis of Tasks, Operations, and Systems

Furniture Design--see also Seats and Seating

G

G Forces--see Motion, Effects of (acceleration and deceleration)

Gain--see Control-Display Dynamics (movement ratios)

Galvanic Skin Response--see Physiological Capacities and Indices

Galvanometer--see Physiological Equipment and Methods (other methods and equipment)

Game and Decision Theory

Gases--see Environmental Conditions and Effects

Gas Masks--see Masks

General and Comprehensive References in Human Factors Engineering

- articles and reports
- bibliographies
- books
- films
- handbooks
- symposia and conferences

Glare--see Flash (blindness); Visual (comfort and fatigue)

Glasses--see Optical Aids

Gloves--see Clothing (handgear)

Goggles--see Optical Aids

Graphs and Tables, Design of

Gravitational Forces--see Motion, Effects of (acceleration and deceleration)

Gravity, Centers of--see Anthropometric Measures

Grenades--see Weapons Systems, Design of (handheld)

Grips--see Controls

Grip Strength--see Anthropometric Measures (muscular strength)

Ground Support Equipment--see also Space Flight Systems; Weapons Systems, Design of

Grouping of Components--see Panel and Console Design (layout)

Groups

- air crews
- communication
- evaluation
- general
- infantry squads
- interaction
- leadership
- missile crews
- morale
- performance
- research techniques
- selection
- ship and submarine crews
- size and structure
- space crews
- tank crews
- theory
- training--see Training

Gunnery Training--see Training (specific types)

Gustation--see Smell and Taste

Gust scale--see Smell and Taste

H

Hand

- dimensions--see Anthropometric Measures
- grips--see Controls
- signals--see Signaling Systems, Visual
- strength--see Anthropometric Measures
- tools, design of--see Tools, Design of
- wheels--see Controls (rotary movement)

Handbooks--see General and Comprehensive References in Human Factors Engineering

Handbooks, Manuals, Texts, Design of

Handedness--see Motor Performance and Skills

Hand Grenades--see Weapons Systems, Design of (handheld)

Handgear--see Clothing

Handles--see Controls

Harnesses--see Belts, Harnesses, and other Restraining Devices

Hats--see Clothing (headgear)

Headphones--see Auditory (equipment)

Head Size--see Anthropometric Measures

Hearing

- aids--see Auditory (devices)
- conservation program--see Ambient Noise (reduction and control)
- loss--see Ambient Noise; Audition (anomalies and individual differences); Speech (audiometric testing)

Heart Rate--see Physiological Capacities and Indices

Heat--see Environmental Conditions and Effects

Heated Suits--see Clothing (thermal protection)

Heating--see Environmental Conditions and Effects

Heat Loss--see Physiological Capacities and Indices (temperature, body)

Helicopters

Helmets--see Clothing (headgear)

High Altitude--see Environmental Conditions and Effects (atmospheric pressure)

Highway Lighting--see Lighting Systems (outdoors)

Highway Research--see also Safety (motor vehicle and highway); Traffic

Hot Weather Clothing--see Clothing (tropical ensembles)

Hot Weather Environments--see Environmental Conditions and Effects

Houses, Dwellings, and Shelters, Design of

Hue--see Vision (color vision)

Human

- controller (general discussion of man as a control mechanism)
- error--see Error
- information processing capabilities (includes reception and transmission)
- transfer functions

Human Factors Engineering--see General and Comprehensive References in Human Factors Engineering

Humidity--see Environmental Conditions and Effects

Hyperopia--see Visual (anomalies and individual differences)

Hypodynamics--see Sensory (deprivation); Weightlessness

Hypoxia--see Environmental Conditions and Effects (oxygen requirements)

I

ICAO Phonetic Alphabet--see Language Design

Ideal Observer--see Detection Theory; Psychophysics (theory)

Illumination--see Instrument Lighting; Light; Lighting Systems; Vision; Visual; Work Place Design

Illusions, Perceptual--see Perception (illusions)

Image Interpretation, Photographic--see Photographs, Photography, and Photointerpretation